

Veepro dairy management



Mastitis prevention

Mastitis is a multi-factoral disease. There are many factors that have an effect on the risk of the disease in one individual cow, or – still worse – in a large part of the herd. This causes big problems for the farm. We must therefore prevent the invasion of micro-organisms that cause mastitis.

Mastitis will cost a dairy farmer money. The result of clinical as well as subclinical mastitis is that he will suffer in his pocket. But this is not the only loss. The cow suffers, too. It is clear that infected animals are in pain. Dairy farmers should

avoid this as much as possible. In practice pain control is used very little on dairy farms. This is a point of attention.

Teat

By far the most of the infections are caused by micro-

organisms that penetrate into the teat. From there they invade the udder and multiply. It is essential to keep these harmful organisms from entering the teat. A teat that functions well provides a very important

defense. The construction of a healthy teat makes sure that during milking (or suckling a calf) the milk leaves the udder. Between milkings the mammal tissue is cut off by a hermetic seal from the outside world.

Immune system

Infections always put pressure on cows. In their bodies and in the environment are always latent or dormant agents of mastitis, such as bacteria, fungi, protozoa, algae and even viruses.

Under normal conditions the cow's immune system is well capable of dealing with organisms that invade the udder. For a while the infection may trouble the animal, but it soon disappears. The only noticeable reaction of the immune system to an infection is a higher cell count during this time (especially leucocytes). There may be some clinical symptoms such as flakes in the milk.

Healthy animals soon overcome these symptoms. An immune system that functions well will beat the infection. Still frequently the disease breaks out, causing a more or less serious infection and with varying results.

Preventive dipping

Dipping the teats in the close-up period (two weeks before the expected date of calving and a post-dip) may be very preventive. It certainly decreases the accessibility to the teat. Also, as the teats/udder are checked daily, the chances of any abnormalities being recognized increase.

Preventive dipping



Shape and position of the teat have a great effect on the milkability but no less on the sensitivity to infections

Shape of the teat

Cows have teats that are very different in length, diameter and position. This variety of shape occurs within one breed and between different breeds. The length of a teat may range from three to fourteen centimeters. In individual cows the length increases from the first to the third lactation period. Then it remains the same. The diameter may range from two to about four centimeter.

Teat

The sphincter muscle surrounding the teat canal maintains a tight closure between milkings. The muscle

limits bacterial penetration from the teat opening into the interior of the quarter. The teat canal remains dilated for one to two hours following milking.

The immune system

If micro-organisms manage to break through the keratin in the teat, the next defense is waiting the immune system of the cow.

Especially bacteria manage to penetrate the teat canal. There they come up against the defense system. Activation of this system takes place at the internal entrance to the teat canal in the Rosette of Furstenberg (see picture). This is a ring or tissue containing lymphocyte and plasma cells which are important in the recognition of foreign invaders and which stimulate the first stages of an immune response. This defense is well-organized but not foolproof.

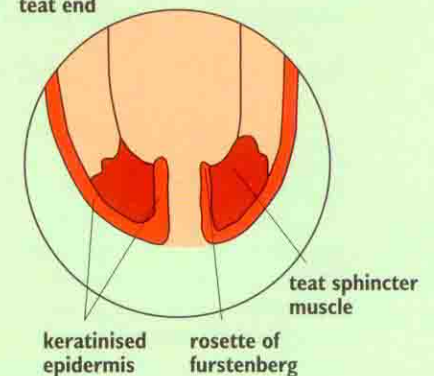
In order to prevent mastitis it is important to identify factors that may have a negative effect on the functioning of the immune system.

The teat canal keratin is a gummy substance produced by the skin lining. The keratin acts as a kind of stopper and as such is a natural barrier against micro-organisms



*From top to bottom:
Normal keratin layer on the skin and the teat end
Bacteria can colonize hyperkeratinisation of the skin and the teat end, and the cavities in the teat canal
Extreme hyperkeratinisation of the skin and the teat canal. The teat canal cannot close anymore*

teat end



Edema may cause mastitis



Edema in the udder



Edema in the chest



Edema under the head

About two weeks before calving down the udder starts to develop and to fill up. In heifers this may occur sooner. In some animals the normal udder development before calving down may lead to serious dropsy (edema). This process is most frequent in animals having their first calf. Excessive release of fluids from the vessels causes the udder and surrounding tissue (abdominal wall and thighs) to swell. The swellings are painful and they change the cows' lying-down pattern: these animals

are often chewing the cud in a standing position. There is also a lower feed intake and this is disastrous, because at the end of the pregnancy when the calf is growing fast, energy needs are largest. The cow or heifer then starts living off her fat reserves. As a result she may develop ketosis (clinical, the wasting form) before calving down. Animals suffering from clinical or subclinical ketosis are particularly more prone to environmental bacteria causing mastitis at the time of calving.

Streptococcus uberis and *E-coli* are environmental bacteria that are very notorious. At this stage they may cause clinical mastitis which is not identified until the first milking after calving.

Final weeks critical

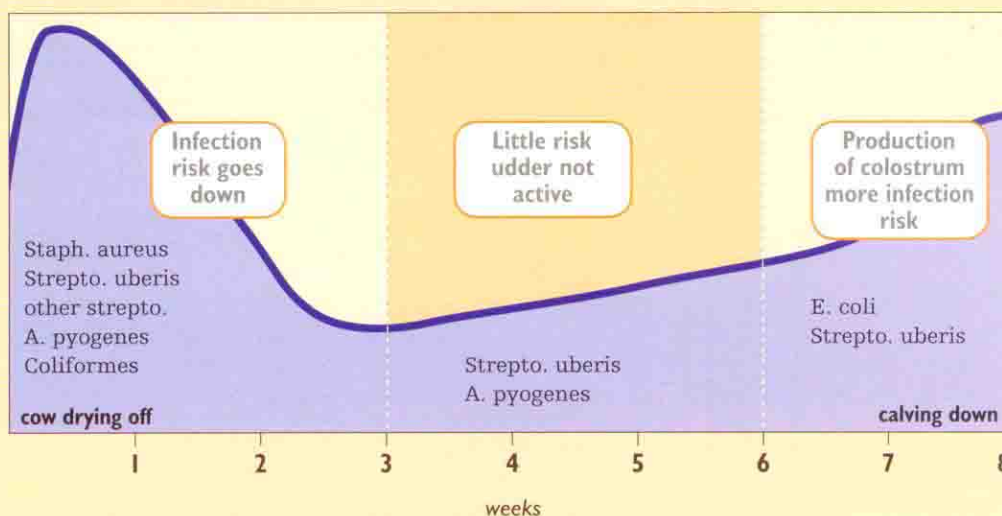
There is a greater risk of environmental bacteria before calving because at this time the presence of the antibiotics used for drying off can no longer be demonstrated. In some cows the keratin plug that was formed in the beginning of

the dry period disappears after 7 till 10 days. At this moment the cow starts producing much colostrum while at the same time the level of lactoferrine goes down and the iron content (Fe) rises. As a consequence of all this the lymphocytes produce less antibodies. Some cows are leaking milk before calving down so that especially the environmental bacteria get a chance to enter and increase the risk that mastitis might break out.

Keratin plug disappears

- Keratin disappears 7-10 days before calving
- At the moment of production of colostrum → lactoferrine goes down and Fe goes up
- Lymphocytes produce fewer antibodies
- Lower activity of lymphocytes recognizing and killing bacteria

Infection risk in dry period



Milk before calving down

In extreme cases dairy farmers are advised to milk the cow before calving down. If there is colostrum the farmer may freeze it and feed it to the calf later. If there is not, the frozen colostrum of a different cow must be used. Milking before calving reduces the pressure in the udder. This makes the cow often feel much more comfortable. She will feed better and chew the cud while lying down more than before. This makes the risk of mastitis at the time of calving down smaller. The milking process must be started up gradually. In the first days short machine milkings are good enough.

Sixty per cent of cows with sagging quarters are culled because of high cell counts and mastitis problems

It is quite possible that the cow gives little milk for the first three milkings, but by stimulation of the milk gift, the so-called oxytocine phenomenon, the cow will produce more every day. At the time of calving the yield may be as high as 18 or 20 kg per day. After three days milking the milk can go to the dairy factory. The first two days the cow may give some colostrum.

Edema

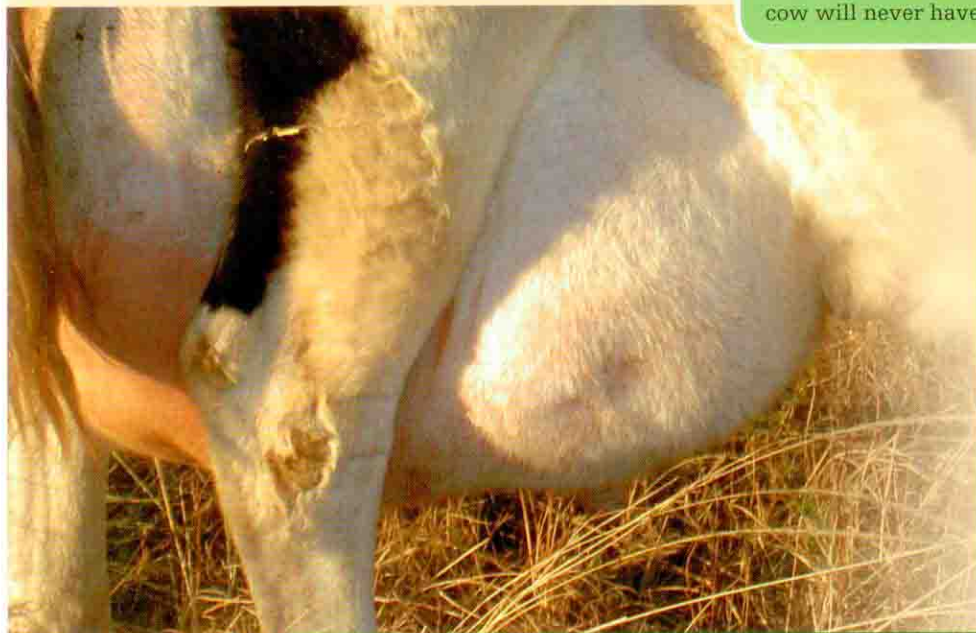
Too much body fluid due to the fact that the lymph glands that drain the fluids are not well-developed.

Two-year old heifers are most susceptible.



Milking before calving

Example of a cow milked from ten days before calving. The photo was taken five days before calving down when she had been milked for five days. Dairy farmer De Jong (from the famous Rita cows) about this method: The cow runs less risk of developing mastitis and the attachments of the udder are not overstressed so that the cow will never have a sagging udder.



Mastitis in heifers

Next to the measures that decrease infection risks (hygiene) and dipping, farms with high rates of clinical mastitis in heifers at the time of calving might also infuse antibiotic at drying-off that provides extra protection against the pathogens found on the farm. This should be done about eight weeks before the expected calving date.



VEEPRO HOLLAND

Information centre for Dutch cattle

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Fokko H. Tolsma, dairy farm management

consultant Veepro Holland is responsible for the contents of Veepro Dairy Management.

Publisher
Veepro Holland
P.O. Box 454,
6800 AL Arnhem,

phone: 0031 26 3898740,
fax: 0031 26 3898744,
e-mail: info@veepro.nl
internet: www.veepro.nl

Contribution
Marinus Pietersen of PTC+
(Dairy Training Centre)
Oenkerk

Photos
Harrie van Leeuwen,
Fokko H. Tolsma

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